

## TRACES – ‘READING’ THE ENVIRONMENT

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### Abstract

This paper looks particularly at informal and implicit sources of information in our environment, how we can read this kind of information, and how the information has come about. The paper focuses on implicit information and ‘reading the environment’, with examples from practice, and presenting an art project that investigates this notion through an interactive video installation. This installation, called ‘Traces’, presented interactive videos and photographs of two types of human-made traces, revealing past behaviours and/or intentions. It took for instance the skidmarks of cars on roads as input for a process of video manipulation and a recorded sonification.

**Keywords:** traces, implicit, peripheral, multimodal, interaction, environment.

Information is present all around us, not only the human made, intentional or accidental representations, but also the unintended and implicit. Some of this information we are not aware of. We live in a dynamic environment, constantly changing by the forces of nature, animals, growth, and human action. In this paper the three main modes of communication, knowledge representation, and interaction are described. These modes are the *manipulative* (physical interaction), *iconic* (mimicking) and the *symbolic* (abstract).

Not all of the information in our environment will be recognised as such by all perceivers, it depends on their individual knowledge, experience, approaches, values and mindset. This ecological reciprocal relationship between people and their environment is the basis of much of the work by J. J. Gibson [1, 2], including the concept of *affordances*. Affordances are an important notion and perhaps due to the ecological nature (what an object affords depends on the perceiver’s knowledge, abilities etc.) it seems only recently to have become a topic discussed in semiotic literature [3]. Affordances always has been an important notion for the design disciplines, for instance through the work of Donald Norman [4] and Bill Gaver [5]. The notion of affordances is relevant in guiding and leading the user when interacting with an object or system. Affordances suggest potential usage.

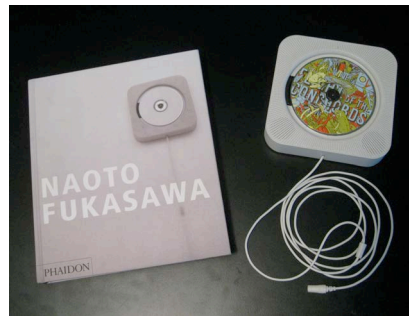
The role of an affordance in the manipulative mode can be compared with the role of a written instruction in the symbolic mode, or the function of a pictogram in the iconic mode.

In this paper I focus on the peripheral, implicit and unconscious modes of interaction, which can be applied in the process of designing for interaction. These modes are illustrated with a number of examples in the next section. This forms the basis of the “Traces” interactive audiovisual installation developed by the author, as a means of researching the interpretation of implicit information in the environment.

### Reading the environment

The implicit modes of interaction are best understood in an ecological approach, where meaning and potential can be communicated only if certain interactions occur between entities in the ecology. Affordances are a good example of implicit interaction, potentially informing a person (or animal) of a possible use of the object. In a way it is about “tuning in” to the environment. The examples I use in lectures show this tuning in, aiming to be opening up the eyes, ears and other senses, encouraging people to find the hidden clues and information in their environments. Most importantly, this supports the students to apply this knowledge in their design processes. I have been using examples from other disciplines, for instance detectives who find clues in the environment to solve crimes, or the film *The Tracker* by Rolf de Heer, which contains strong examples of the superior ability of the Australian Aborigines to read the natural environment.

**Fig. 1. The work of Naoto Fukasawa**



Naoto Fukasawa is a Japanese designer who is known for his attention to these hidden clues in the environment and turned them into design input [6]. He has conducted a design workshop since 1998 called “without thought” which was about the unconscious responses of people to clues and affordances in their environment. One of Fukasawa’s observations was that people writing messages using mobile or smart phones in public space, use the omnipresent guiding bumps on the pavement intended to aid

the sight impaired, to find their way. He gives several examples of these kinds of unintended usage, and even how affordances can be perceived that subvert the intended use of an object. This could be seen as an inappropriate affordance, such as the metal Braille signs’ horizontal surface and texture which ‘affords’ extinguishing a cigarette!

The picture in Fig. 1 shows one of his most famous designs, a CD player for Muji. It mimics a kitchen or bathroom fan, deliberately subverting the expectations of the user. The most interesting feature is the cord, which asks to be pulled, and this affordance is reinforced by the user’s tacit knowledge of how to switch on a kitchen fan. It is not a false affordance: the playing of the disc starts and stops by pulling the cord.

In the sonic modality, an excellent example of tuning in to the environment can be found in the work of Canadian composer and scholar Murray Schafer [7]. He argues for better listening and awareness of the sounds in the world, not only music. He uses the term *Soundscape* to describe this. The current trend of people listening to heavily compressed MP3 versions of music, the pathological ‘iPod ears’ (recurring ear infections), and this tendency to actually shut out the environmental sounds are all problems that Schafer anticipated.

In the following paragraphs a number of examples of reading the environment are presented.

### Animal traces

Normally animals leave few traces that we can perceive. They do however leave olfactory traces (sometimes involun-

**Fig. 2. Animal traces revealed by snow**



tarily), which other animals can pick up and follow. In a snowy landscape however the imprints of animals become visible (the picture in Fig. 2 is taken in the Belgian Ardennes). The other picture in Fig. 2 shows the presence of voluntary olfactory traces, the dog urine, which had stained the snow yellow, making the invisible visible.

When lots of animals use certain trails, the tracks become visible as in the pictures below in Fig. 3. The picture at the bottom of Fig. 3 tells a little story. It is the narrative of traces, revealing that a bird has landed, to catch a clam.

**Fig. 3. Traces in nature**



#### *Desire lines*

People often leave traces by repeated walks along made up tracks, not unlike the animal tracks above. They are sometimes called 'lines of desire', as they express the desire of the people to establish a track in a certain location. Many people can indicate their preference for a path, which gets established by their cumulative actions [8]. These tracks people create for instance in public parks as alternatives to the designed footpaths, designing with their feet. In a way it is the aggregated expression of many people saying: "the path is in the wrong place", and could ideally be input for a (re-)design process.

This principle can also be applied to interface design [9], indeed we see some



**Fig. 4. Traces reflecting people's desires and past behaviours**

software learning from our repeated actions or mistakes.

An emerging path, maintained by the feet of many walkers, can still be ignored by town planners. In other cases however such desire lines will become de facto paths, and accepted by planners who turn it into an official path (a well known one for people in the Netherlands is the track from the train station in Eindhoven to the university campus). In urban planning and landscape gardening it has become an accepted design practice albeit applied in rare cases, to approach a landscape as a 'tabula rasa' and let the people assist in establishing the paths.

Another example is shown in Fig. 4. It is a spatial narrative, found on the way from a station to a university in Amsterdam. The pictures are taken over a period of 2.5 years, and show various iterations in the development of a shortcut by pedestrians, and the planners' responses to obstruct the making of the path. Eventually a low fence is placed to protect the flowers that were put there to discourage people to create a shortcut.

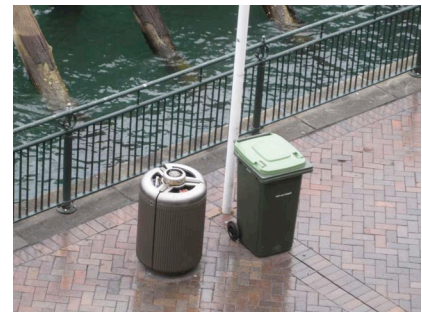
#### *Implicit responses to designs*

People respond to the design of their environments in many implicit ways. A good example is the response to missing bins in stations or parks, where the rubbish will be piled up neatly on the spot that is evident from the accumulated responses of the audience. In the same way as the ad-hoc design of people's desired paths, people express a certain need implicitly here.

There are many of these clues in the environment. It is important as a planner or designer not to ignore these signs, however much they may hurt the pride, and take them as input for design processes. In Figure 5 is an example, of the main ferry station in Sydney. The bin on the left is the official bin, anchored in the pavement, well

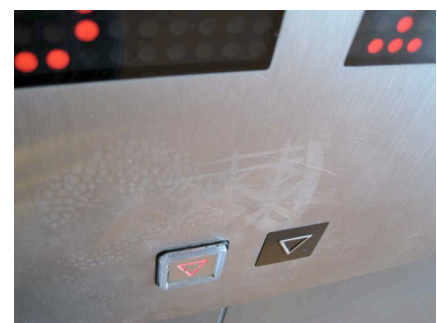
designed both aesthetically as well as functionally. It lacks the capacity to deal with the amount of rubbish the people coming off the ferries need to dispose off – the ad-hoc placement of the bin on the right reveals this shortcoming.

**Fig. 5. "the bin is too small"**



The footprints in Figure 6 (note there are two different imprints!) reveal possible anger at the lift button. This may also have been a response to a common mistake made by users, that the lift button and the icon next to it are almost identical, making the latter superfluous. Often people try to press the icon, and get frustrated.

**Fig. 6. "the lift takes too long"**



All these examples show how people express themselves in the manipulative mode of interaction, often in implicit ways, rather than through the iconic and symbolic modes which tend to be more explicit.

## Traces - the road as canvas

To provoke people to become aware of certain traces in their environment an interactive video installation was developed for the curated gallery at the design faculty at UTS in June 2010. The installation presents examples of the interaction modes as described in the background section of this paper.

In addition to my academic research and development of theoretical frameworks for interface design [10], I often include artistic explorations in my research approach, as it opens up new ways of presenting and engaging audiences in the questions that are investigated. The reflections of the work and discussion of the results of the underlying research questions posed are generally presented in academic publications [11, 12].

In the installations in this exhibition there were a number of leads and elements, reflecting a fascination with the traces in our environment - traces of past behaviours, traces of use, traces of invisible structures around us, traces which can make perceivable the electronic ecology we live in. The aim of the exhibition was to encourage visitors to open up their senses to the hidden fabric revealed through the traces, by zooming in, changing perspective, altering viewpoints, and focusing in different ways.

The installation took two examples of traces found in the environment, one rural and one urban. They reveal past behaviours through certain expressions, or hidden infrastructure respectively.

The installation was a result of the

author's research and design approach which aims to make the invisible seen, the inaudible reach our ears, and the intangible touched. In other words, the design approach is about 'making physical' our surrounding virtual world of computers, networks, electronic circuits, radio waves etc. While it is convenient for those developing the contemporary technologies to keep things unclear, inherently concealing its many flaws, for the users it is important that technologies are demystified. It is key to the approach of the electronic ecology which emphasises *interaction* rather than exclusion.

### Pavement Painting

Perhaps it was the outsider's perspective (being Dutch - in my own country people who spray paint on the pavement get arrested), that brought a fascination with the markings found around building sites on pavements and roads. Unintentionally, traces of underlying technological infrastructure below the pavements and streets are brought to our perception through this kind of "builders' graffiti". It is still full of mystifying jargon, clearly not intended to be understood by us but it is hard to ignore in its bright (and accidentally often quite beautiful) graffiti-writing. The mode of expression is mostly symbolic, and occasionally iconic. Over the years I have collected many images of these *pavement paintings*. Out of the hundreds of images, seven photographs were selected and printed which were put on the walls, and five videos played on screens on the floor, accompanied by a soundscape on two

speakers. The videos were made by following the more elaborate and extended pavement paintings I encountered, and displaying them on the floor seemed appropriate as the video screens mimicking the street tiles.

### Skid Scream

The image material for *Skid Scream* came out of observing the skid marks on roads in certain areas. It was as if the street has been treated as a canvas, and the car tires as a brush. The traces left seem to be a by-product of the high powered cars as extension of the drivers. It is a sinister form of expression in this process, but when isolated afterwards it results in fascinating images. I followed the lines on the roads filming them, chasing the curves and figures produced. They have created patterns in space and time, that would have pleased Paul Klee or Wassily Kandinsky. In the spirit of Klee's notion of 'taking a line for a walk', La Monte Young's famous Fluxus piece with the single instruction 'draw a straight line and follow it', and graphical scores such as John Cage's composition *Ryoanji*, I then followed, complemented, contrasted and translated the shapes into music. Using feedback guitar with extended playing techniques (slide, e-bow and digital pitch change pedal) the skid mark curves were interpreted in continuous glissandi ('skid screams'), recorded without overdubs. Using the extended playing techniques it was possible to follow two lines at the same time. In the installation there were six video fragments, each with their own sound track, distributed over two screens and two speakers. On each screen the video was mirrored, on a vertical (landscape) screen on the left and a vertical

(portrait) screen on the right, to accentuate the movements of the lines.

Furthermore, the images subtly responded to audience movements in the space through position sensors mapped to slight deformations of the image. A video screen on the floor, which showed a close-up of a skid mark followed as a line, linked the floor screens to the screens on the wall.

Fig. 7 Traces installation, with Pavement Painting elements and Skid Scream screens.



## Discussion and future work

The message I am intending to get across with this paper is that there are many ways of interacting and information representation that utilise the peripheral and the informal, rather than the explicit and focal. By presenting a theoretical overview about multimodal interaction, and by giving examples of reading the environment, I hope to have conveyed the significant potential of these particularly underused modes. The main purpose of this endeavour is to encourage designers and developers to apply these modes in the design of interfaces. The 'radiation' of electronic information can be seen as an essential part of any design of a digital system.

From the advantage of being a relative newcomer in the country I now live in, which enables me to see things differently and notice different things in our everyday environment, the "Traces" interactive video installation was developed. Some of the interesting feedback was that many people have been struck by the pavement paintings or builder's graffiti presence. There is still the element of vandalism in it for me, even though some of the imagery is rather striking. The spray painting doesn't occur just on the tarmac, there seems to be no inhibition to mark on granite or stone surfaces. This is in line with the local habit of digging up pavements and replacing brick or granite tiles with tarmac afterwards, contributing to the urban scars. In a recent article in the local newspaper [13] one of the responsible people claimed the signs wear away quickly, but there is evidence that they are still clearly visible even after several years. The article also elabo-

rates on the meaning of the signs, accentuating their categorisation in the symbolic mode of communication (colours and jargon) but that was, although interesting, not the focus of my project. My aim was to bring the implicit hidden structures under the attention, from which the audience was encouraged to explore further and for instance work out the colour coding.

The skid marks remain a fascinating yet elusive phenomenon. From the installation and presentations I did about it in the faculty, I gathered feedback about the process of 'doing donuts'. I have noticed of course that the skid marks mainly occur in areas where there is potential for young people to hang around bored and finding this a way of entertaining themselves. As such, the trace is a reflection of social-cultural behaviour related to a particular demographic. Apparently it involves joy-riding in stolen cars in some cases. However fascinating and sensational in their imagined processes of making, how these skid mark traces came about is not the most important issue for me to explore. This is more the domain of the contemporary Sydney artist Shaun Gladwell [14, 15], whose fascinating work engages strongly with street culture and extending its potential for expression in various video works. My main message is that there is a link between the trace and past behaviours, and like with the interpretation of the builder graffiti, to encourage the audience to work out further layers of meaning for themselves. They are a bit like crop circles, just a little more interesting in shape. This is why I added the layer of sonic interpretations of the curves, they seemed to possess a musical

quality in the presentation. It is still a tantalising possibility though to investigate the sounds originally made in the process....

For the opening of the exhibition, some of the sonifications were performed live by the author on electric guitar and Jos Mulder on electric piano. For the closing event the installation was extended with several further spatial video works in the adjacent Interactivation Studio. This emphasised the ongoing development of the work, both as an artistic exploration as well as a continuing input from this and other practices into the development of the theoretical framework and insights applicable to design practices. The intention of this work is to find new insights through this cross-disciplinary approach.

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Fig. 8. Still from interactive video, as result of manipulations of the tire marks footage.

